

**SYNTHESIS, CHARACTERIZATION AND ANTIBACTERIAL  
ACTIVITY OF Co(II), Cu(II) AND Cd(II) TRANSITION METAL  
COMPLEXES OF NOS TRIDENTATE SCHIFF BASE DERIVED  
FROM S-2-FLUOROBENZYLDITHIOCARBAZATE AND ISATIN**

**NUR AFIDA IDAYU BINTI KAMARUDDIN**

**BACHELOR OF SCIENCE (Hons.) CHEMISTRY  
FACULTY OF APPLIED SCIENCES  
UNIVERSITI TEKNOLOGI MARA**

**MAY 2010**

## **ACKNOWLEDGEMENTS**

Alhamdulillah, all praise is to Allah and blessings are upon His Prophet Muhammad SAW, whose ultimate guidance creates more meaningful purpose of this work by giving me strength, courage and spirits to complete this work.

Upon completion of this project, I would like to express my gratitude to many parties.

Firstly, I would like to acknowledge the contribution of my supervisor, Encik Mohd Abdul Fatah Abdul Manan. As a supervisor, he has been patient and supportive. Thank you very much for giving me guidelines, freedom of work and constant encouragement throughout the course of this work.

Not forgetting to all my friends and also my parents for their encouragement, ideas and guidance upon completing this proposal. I wish to express my sincere gratitude and appreciation to all individuals or groups who directly or indirectly participated and contributed towards the completion of this work.

Nur Afida Idayu Kamaruddin

## TABLE OF CONTENTS

	<b>Page</b>
<b>ACKNOWLEDGEMENT</b>	iii
<b>TABLE OF CONTENTS</b>	iv
<b>LIST OF TABLES</b>	vi
<b>LIST OF FIGURES</b>	vii
<b>LIST OF ABBREVIATIONS</b>	viii
<b>ABSTRACT</b>	x
<b>ABSTRAK</b>	xi
<b>CHAPTER 1 INTRODUCTION</b>	
1.1 Schiff base	1
1.1.1 Dithiocarbazate derivatives	4
1.1.2 Schiff base and their complexation	5
1.2 Antibacterial activity	7
1.3 Problem Statement	8
1.4 Objectives of study	9
1.5 Significant of study	10
<b>CHAPTER 2 LITERATURE REVIEW</b>	
2.1 Synthesis of Schiff base and their metal complexes	11
2.2 Characterization methods	16
2.2.1 FTIR spectroscopy	16
2.2.2 NMR spectroscopy	18
2.2.3 Melting point determination	20
2.3 Biological studies	21
2.3.1 Antibacterial screening	21

## ABSTRACT

### **SYNTHESIS, CHARACTERIZATION AND ANTIBACTERIAL ACTIVITY OF Co(II), Cu(II) AND Cd(II) TRANSITION METAL COMPLEXES OF NOS TRIDENTATE SCHIFF BASE DERIVED FROM S-2-FLUOROBENZYL DITHIOCARBAZATE AND ISATIN**

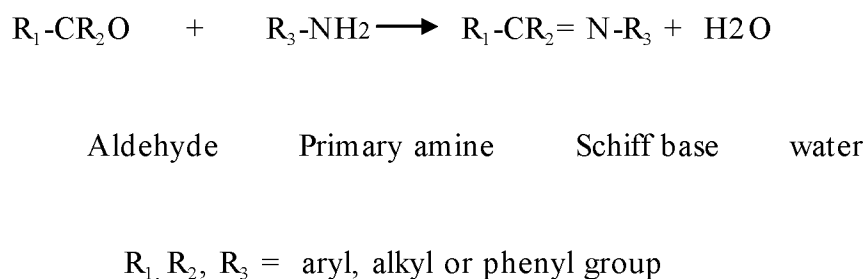
A new Schiff base was formed from the condensation reaction of S-2-fluorobenzyl dithiocarbamate with isatin. Complexes of cobalt(II), copper(II) and cadmium(II) with Schiff base were successfully prepared. These compounds were characterized by elemental analysis and various physico-chemical techniques. The analysis of IR data shows that the Schiff base was coordinated to the copper(II) and cadmium(II) ions as NS bidentate ligands whereas in cobalt(II) ion as NOS tridentate ligand. The Schiff base and its metal complexes were screened for antibacterial activity by using disc diffusion method. Antibacterial activity screening was carried out against Gram positive and Gram negative bacteria which are *Bacillus subtilis* and *Pseudomonas aeruginosa*. The metal complexes were found to be strongly active against these selected bacteria compared to Schiff base.

## CHAPTER 1

### INTRODUCTION

#### 1.1 Schiff base

Schiff base or azomethine is a compound that contains a carbon-nitrogen double bond with the nitrogen atom connected to an aryl or alkyl group (Imran *et al.*, 2007). Schiff bases are of the general formula  $R_1R_2C=N-R_3$ , where  $R_3$  is an aryl or alkyl group that makes the Schiff base a stable imine. Schiff base also derived from an aniline, where  $R_3$  is a phenyl or substituted phenyl known as anil. Schiff bases can be synthesized from an aromatic amine and a carbonyl compound by condensation reaction.



**Figure 1.1** General formula of Schiff base (Parekh *et al.*, 2005)